EF, but gaining enough energy by that means to make up for that lost by friction with the air. He will thus gradually rise from the earth, and at the same time drift along with the wind.

WM. H. PICKERING.

Harvard College Observatory, Cambridge, Jan. 1.

The Great Lake Basins of the St. Lawrence.

THE following are the conclusions of a paper under the above title to appear during January in the *Canadian Record of Science*, and the object of which is to suggest what has been the origin of the present contours of the Great Lakes: —

That glaciers, while contributing some results, had not much effect in eroding the lake-basins proper, or in shaping the present general outlines.

That the superficial deposits are the accumulations of denudation during immense periods of time since the carboniferous and earlier eras, and are not to be specially credited to the operation of glaciers.

That Lake Superior is the most ancient of the lakes, dating its origin as far back as Cambrian, Keweenawan, and Huronian times; that it is, in part at least, a synclinal trough; that volcanic action has had most to do with its origin and the shaping of its coasts; that its early outlet was through the depression in Whitefish Bay; and that its waters joined the great pre-glacial river system at or near the Straits of Mackinac.

That Lakes Michigan, Huron, and Ontario were originally the bed of a pre-glacial river which first crossed the Ontario peninsula along the Niagara escarpment, and afterwards was diverted to a course by way of Long Point, Lake Erie, and the Dundas valley; that their basins were largely defined by the elevation of the Niagara and Hudson River escarpments, and in more recent times by warping of the strata and deposit of superficial sands and clays which blocked the old river-channels and resulted in the lake-basins retaining their water on the final elevation of the land to its present general levels.

That the pre-glacial river system expanded into lakes of some size in each of the present basins of Lakes Michigan, Huron, Erie, and Ontario.

That Lakes Erie and St. Clair are the most recent of the lakes, and have at one time been more closely united; and that the formation of this united lake was due to the blocking of the old outlets both by superficial deposits and warping of the strata, and to the water being thus retained in the basin on the final elevation of the land to the levels of to-day.

That great fractures at or near the outcrops of the strata occasioned by the directions of the forces which elevated the strata, originated, in many instances, the deep bays and inlets which indent the Niagara and Hudson River escarpments, and rocky coastlines of Lakes Michigan and Huron; these effects being afterwards supplemented by the action of waves, currents, atmospheric causes, and probably local glaciers.

That since the elevation of the land to the levels of to-day, the action of waves and currents on the clay cliffs and sand deposits has in many places greatly rounded off the general outlines of the coast, and the material from this and other sources has been spread over the lakes, or has served to create new features in the coastline elsewhere.

A. T. DRUMMOND.

Montreal, December, 1888.

Color of Katy-did.

THERE has recently come into the possession of the writer a specimen of the Katy-did showing a remarkable variation in color. The whole body is of a beautiful and delicate rose-pink. The specimen, when captured, did not seem to be abnormal in any other respect. It has been identified by a member of the entomological division of the Agricultural Department as *Phylloptera oblongifolia*. It seems to be a rare variation, though from the same gentleman we learn that at least one similar case has been recorded. A specimen exactly like this one in color is mentioned by Riley in his "Sixth Report on the Insects of Missouri" as having been sent to him many years ago.

L. N. JOHNSON.

Evanston, Ill., Dec. 30.

Various Definitions of Manual Training.

AN article in *Science* of Jan. 4, under the caption of "An Authoritative Definition of Manual Training," embodies an abstract of the report of the special committee on manual training of the New Jersey Council of Education, the semi-annual meeting of which body was recently held at Trenton, N.J. The committee, in concluding its report, submitted the following resolution, which was unanimously adopted: —

Whereas there are several and conflicting uses of the term "manual training," be it hereby

Resolved that the New Jersey Council of Education defines "manual training" as "training in thought-expression by other means than gesture and verbal language, in such a carefully graded course of study as shall also provide adequate training for the judgment and the executive faculty." This training will necessarily include drawing and constructive work, but experience alone can determine by what special means this instruction may best be given.

From an educational standpoint, the definition of "manual training" formulated by the committee would appear to be indisputable; but that the definition, supported as it is by the broad pedagogic principles which underlie it, will be universally accepted as authoritative and final, is not as certain as that the definition is such as to best subserve true educational aims. At least, it is safe to say that thousands of educators and school-officers must eliminate from their minds the impression that manual training has for its object the learning of a trade or the acquisition of mechanical skill alone, ere the definition given by the committee can have free course.

Again: there are others who are unwilling to accept the *dicta* of schoolmen, and who insist upon the mere technical or industrial phase of manual training, and can see nothing beyond it. Any thing that does not centre in this is, to them, an indubitable evidence of inutility. Training of thought, of judgment, of expression, etc., as educational stimuli, do not as potent factors enter into their conception of the aim and end of manual training.

That the training of the school workshop has a reflex influence upon the traditional occupations and "studies" of the classroom, causing pupils to reflect, to compare, to be careful and exact in these also, has not thus far been taken into the estimate of the worth of manual training as generally as the facts warrant; for manual training is not that of the hand alone, but of the intellect as well.

The joint training of the mental faculties and the hands tends to dignify the labor of the latter, — the form of labor which by many is alone recognized as "work." But it does not end there: it affords at the same time opportunities for the discovery of latent inventive or mechanical genius, and, when such discovery is made, serves as a guide in the choice of employment.

One must necessarily lead an unsatisfactory and precarious existence, who, from a false estimate of the relative respectability of two or more employments, chooses that for which he has but little natural aptitude and less acquired skill. And is it not true that the popular education of the past has tended toward the making of such choices? Has it not tacitly inculcated the idea that professional employment — the law, medicine, the pulpit, or the professor's chair — is the "chief end of man" according to the creed of the schools? In numberless instances such choices have been made, with the attendant and natural result of dismal failure.

As a corrective, manual training brings to bear a species of craniology which will eventually develop a more rational creed; and this view of manual training I conceive to be entirely compatible with the definition which the committee on manual training formulated.

O. M. BRANDS.

Paterson, N.J., Jan. 7.

Color-Blindness.

A SHORT time ago I tested the color-perception of forty-two boys who had had kindergarten training. Their ages were from nine to fifteen. Not one of them made an error in matching colors. They were not asked to name them. This result suggests further investigation upon this class of pupils, not only to add one more fact to our knowledge of color-blindness, but also to determine the value of early instruction in colors.

ARTHUR STEVENS.

Jefferson, N.Y., Jan. 6.